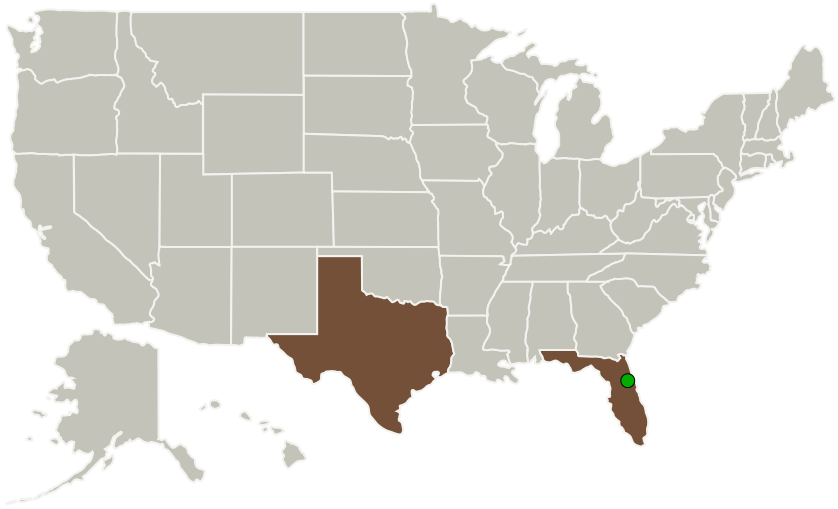
MEMS Gyroscope with Interferometric Detection, Phase I

Completed Technology Project (2011 - 2011)

Project Introduction

This SBIR Phase I project will develop a MEMS gyroscope that uses an ultra high resolution sensing technique for measuring proof mass motion. The goal is to demonstrate the feasibility of this concept by understanding the optical, mechanical, and electrical performance characteristics that result from using micro interferometric sensing in a MEMS gyroscope. Specific objectives of the Phase I effort are to (1) develop a system level model that captures the behaviors of interest and enables design decisions (2) demonstrate sufficient optical performance for high resolution sensing in a prototype scale package and (3) show that this sensing technique improves device stability by enabling a design with a large separation between the sense resonance frequency and drive resonance frequency. This large separation in frequencies results in a device with much greater stability and better performance over temperature enabling the use of this technology in metric tracking hardware and tactical navigation applications. The TRL at the beginning of the contract is between zero and one. At the end of the contract the TRL will be 3.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Fine Structure Technology LLC	Lead Organization	Industry	Austin, Texas
Kennedy Space Center(KSC)	Supporting Organization	NASA Center	Kennedy Space Center, Florida

Primary U.S. Work Locations	
Florida	Texas

Project Transitions

February 2011: Project Start

September 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140188)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Fine Structure Technology LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Matthew D Ellis

Co-Investigator:

Matthew Ellis

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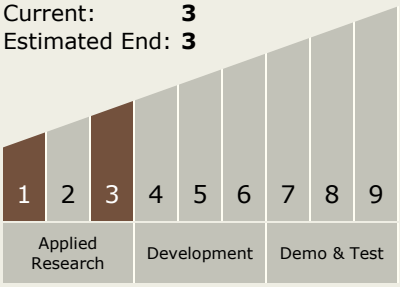
Technology Maturity (TRL)

Start: **1**
Current: **3**
Estimated End: **3**



Technology Areas

Primary:

- TX13 Ground, Test, and Surface Systems
  - TX13.3 Assembly, Integration and Launch
    - TX13.3.3 Launch, Recovery and Reutilization

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System